The Analysis of Verbal Behavior 1996, 13, 65-77

Delayed Outcomes and Rule-Governed Behavior Among "Noncompliant" and "Compliant" Boys: A Replication and Extension

David Reitman
Louisiana State University

Alan M. Gross
University of Mississippi

The present research investigated the effects of verbal, contingency-specifying, stimuli on compliance among two groups of preschool-aged boys. Experiment 1 assessed the joint influence of prior compliance history and reinforcement parameters on compliance, and Experiment 2 explored the utility of distinguishing between the evocative and function-altering effects of verbal stimuli. Results from Experiment 1 showed that statements specifying a behavior and an outcome controlled similar levels of compliance in "compliant" and "noncompliant" boys under conditions of immediate reinforcement, but as the opportunity for reinforcement became more delayed (or nonexistent), the performance of "noncompliant" boys deteriorated. Results from Experiment 2 showed that statements specifying immediate and delayed reinforcers, but not statements specifying no reinforcer, controlled high levels of compliance in both compliant and noncompliant boys, even after a 15-20 minute delay in the opportunity to respond. These results suggest that rules, or contingency specifying stimuli with function-altering, rather than evocative effects, reliably control the behavior of boys as young as 4 or 5 years-old.

In recent years much basic and applied research has addressed the effects of verbal stimuli on compliance in children (Barkley, 1990; Braam & Malott, 1990; Mistr & Glenn, 1992; Schweitzer & Sulzer-Azaroff, 1988). Commonly cited "reinforcers" for compliance may not involve traditional reinforcement contingencies because their contingent presentation occurs too long after the causal response (Malott, 1989). Instead, such temporally delayed outcomes may involve rule-governed analogs to reinforcement contingencies. For example, a child may be told, "If you clean your room *now*, you may have ice cream tonight." How a child comes to respond appropriately to contingencies that specify delayed outcomes (i.e., she cleans her room now to obtain ice cream *later*) is perhaps one of the most important reasons for studying the effects of stimuli on the behavior of children. There already exists a vast body of literature examining the effects of operant reinforcement contingencies upon child behavior (Bijou, 1993). And, although "rule-control" may be ultimately based on operant control (see Malott, 1989), the significance of recent research devoted to rules[1] may rest upon

This paper is based on a dissertation submitted by the first author to the University of Mississippi in 1995, in partial fulfillment of the requirements for a doctor of philosophy degree in clinical psychology. This study was supported in part by an APA dissertation award to the first author. We are grateful to Ronald Drabman, Erin Price, Lisa Koch, Elaine Goodman, Gloria Knight, Carole Dye, and the teachers, children, and staff of Briarwood Drive Baptist Preschool, Broadmoor Baptist Preschool, and Bramlett Elementary School. We also wish to thank Richard W. Malott, John Northrup, David C. Palmer, Henry D. Schlinger, and an anonymous reviewer for their valuable comments on an earlier version of the manuscript.

[1]Another term for a rule, the contingency-specifying-stimulus (CSS) was used by Mistr and Glenn (1992) to facilitate the distinction between CSSs with evocative and function-altering effects. Rule is here used more generically. Schlinger's (1990) recommendations for the use of the word "rule" are discussed in the context of Experiment 2.

distinguishing between behavior under direct stimulus control and behavior sometimes described as "rule-governed" (Schlinger, 1990).

The types of stimuli that may be considered rules and the components of rules that constitute important functional units are still being debated (Schlinger, 1993). Schlinger (1990, 1995) has argued that formal characteristics of rules (e.g., specification of antecedent stimuli, responses, or consequences) may be necessary, but stressed that we must empirically determine which formal properties are functionally related to behavior. Earlier studies examining aspects of this important research have implicated the performance deadline as a potentially important functional property of rules (Braam & Malott, 1990).

For example, Braam and Malott (1990) investigated two potentially functional components of a rule; the timing or availability of reinforcement stated in the rule, and the presence or absence of a deadline. Specifically, they asked (1) How is compliance affected by verbal contingencies describing immediate or delayed delivery of consequences, and (2) Do deadlines increase the likelihood of compliance among children under the above conditions? Braam and Malott (1990) hypothesized that rules specifying delayed outcomes control compliance because compliance terminates the "learned aversive condition" resulting from the inclusion of a deadline in the rule statement. Thus, according to Braam and Malott (1990), whether rule statements controlled compliance seemed to depend more on the presence of a deadline than the imposition of a delay to reinforcement. The authors suggested that, "problems in self-control do not result from delayed outcomes or the inability to delay gratification, contrary to conventional wisdom" (p.67). This conclusion may be contrasted with the long held position that impulsive or hyperactive children evidence difficulties with self-control because of problems with delayed outcomes, and experimental work suggesting that delay capability is an important component of self-control (Barkley, 1990; Rachlin, 1991). Since noncompliance with requests, commands, or instructions from teachers and other authority figures are often interpreted as "symptoms of behavior disorders," data suggesting that compliance could be increased with clear specification of deadlines might also be valuable as part of treatment plans for these children.

As Braam and Malott (1990) are careful to note, their study had some methodological limitations. First, a no deadline/immediate reinforcer condition was not included. Thus, it remains unclear whether the deadline, the specification of the immediate reinforcer, or their combination generated such high (over 90%) levels of compliance. In addition, the deadline/delayed reinforcer condition was presented after many trials of immediate reinforcement and interspersed trials without reinforcement. Thus, the extent to which performances in the deadline/ delayed reinforcer condition reflected sequence or schedule effects, as opposed to the influence of a deadline, has yet to be determined.

Though Mistr and Glenn (1992) replicated much of Braam and Malott's (1990) study, they were unable to establish clearly that deadlines comprised an important functional component of the rule statement. In evaluating the effect of immediate versus delayed deadlines, they found no differences in child compliance. A second phase of their study found no differences in compliance between delayed deadline and no deadline conditions. Still, the comparison of delayed deadline and no deadline conditions was based on few trials and did not directly correspond to the no deadline versus immediate deadline comparison implemented in Braam and Malott's (1990) investigation. In our own pilot research investigating the possible role of deadlines in increasing compliance, the inclusion of a deadline in the rule statement has also yielded inconsistent results. Consequently, the status of a deadline and its importance in contributing to the function of contingency-specifying stimuli remains unclear.

Some authors have suggested that the relation between rules and compliance may be better understood by distinguishing between the evocative and function-altering properties of contingency-specifying stimuli. Following Schlinger (1990), Mistr and Glenn (1992) suggested that rules may exert "control" because they *alter* the discriminative or motivational function of some stimuli and that rules which function in this way should be distinguished from verbal stimuli with solely evocative functions. Function-altering stimuli (FAS) can be distinguished from contingency-specifying stimuli having evocative functions in that FAS do not appear to "evoke" or "occasion" behavior as much as alter the evocative function of other stimuli. Further, FAS appear to rapidly endow other stimuli with evocative functions without the kind of discrimination training one would ordinarily associate with a discriminative stimulus (Schlinger, 1993). According to Schlinger (1993), making a distinction between evocative and function-altering effects is important for at least two reasons. First, structural rather than functional definitions of rules lead too readily to mediational accounts of how contingency-specifying stimuli might be related to behavior. Also, a simple discrimination theory of "rules" leads behavior analysts away from an account of how contingency-specifying stimuli might alter the function of other events and even farther from an appreciation of how human behavior is influenced by such stimuli.

Methodologically, Mistr and Glenn (1992) attempted to disentangle function-altering effects from evocative effects by imposing a forced, 20-minute, delay between the rule delivery and the opportunity to respond. By contrast, in Braam and Malott's (1990) investigation the immediate opportunity to respond to a contingency-specifying stimulus (e.g., If you pick up the toys now, you may go to the Magic Box when you are finished) did not permit one to distinguish its evocative effects from its function-altering effects. The results of Mistr and Glenn's (1992) study showed that, relative to their own "immediate opportunity to respond" trials, and Braam and Malott's (1990) earlier study, the children complied at markedly reduced rates when a delay in the opportunity to respond was imposed. With the exception of one experimental condition (no deadline/immediate reinforcer) the data provided little evidence that the behavior of 4-year-old children was affected by function-altering stimuli (Schlinger, 1993).

One potentially important issue that has yet to be addressed systematically is the influence of the participant's prior compliance history. In fact, the ostensible reason for selecting young children is to study behavioral processes among participants with limited "histories." Yet, in previous studies, the issue of participant selection has not been systematically addressed. In the Braam and Malott (1990) study, five children were chosen for their high levels of compliance with teacher requests, whereas one child reportedly completed few tasks. Two additional children requested to join the study in progress. Children in Mistr and Glenn's (1992) study were disqualified if they completed more than 25% (i.e., 1 of 4) of request trials, on the assumption that such children would be insensitive to further experimental manipulation.

To examine the influence of prior history in the present study, groups of children who had completed a high percentage of tasks were retained in a "compliant" group and their performances were compared with a "noncompliant" group selected through the same baseline screening procedure used in Mistr and Glenn (1992). Children were approached in a naturalistic setting (a classroom) and asked to perform a simple task (e.g., picking up blocks). The outcomes specified in the rules were varied and manipulated reinforcement timing or availability. Both noncompliant and compliant children were expected to complete a high percentage of tasks under optimal reinforcement conditions (e.g., an immediate consequence, access to a "Goodie box" was used in the present study). Based upon the existing literature from applied

studies of child behavior problems, we hypothesized that rules specifying delayed delivery of a consequence would exert reliable control over the behavior of compliant, but not noncompliant boys (Barkley, 1990). Experiments 1 and 2 examined the effects of reinforcer timing and availability on compliance, and the effect of distinguishing between the evocative and function-altering effects of verbal stimuli, respectively.

EXPERIMENT 1

METHOD

Participants and Setting

Experiment 1 commenced with the mailing of consent forms describing the study to parents of boys attending a large preschool located in central Mississippi. Fifty-two percent (n=14) of the 27 preschool boys returned valid consent forms. Forty-one percent (n=11) did not return consent forms and 8% (n=2) declined to participate.

Participants were classified as "noncompliant" or "compliant" on the basis of compliance with requests to pick up blocks (i.e., request or screening trials) and teacher nomination. First, three preschool teachers each nominated 3 boys they considered to be "noncompliant." One boy was chosen from each of three classrooms provided that the following criteria were satisfied: consent was obtained, he was nominated by the teacher, and he completed 20% or less (i.e., zero or 1) of 5 request trials. These boys were classified as "noncompliant." From the same three classrooms, control children were selected with the requirement that they have completed at least 80% (i.e., 4 of 5) of request trials, had *not* been nominated by the teacher, and their parents had given consent to participate. These children were classified as "compliant." All six participants were Caucasian, four were 4-years-old and two children were 5-years-old.

Apparatus

The experimental apparatus consisted of a large 2'x1'x1' plastic utility box with a 2" x 1" hole cut into the lid. The lid of the box was secured with a small security lock to prevent boys from opening the box during the trials. For each of the three experimental conditions in Experiment 1 (immediate, delayed, and no reinforcement), a child was given 5 randomly presented opportunities to pick up or place 82 multicolored (orange, yellow, red, green, and blue) and variously shaped (square, half-circle, rectangular, triangular) wooden blocks into the box through the small hole cut into the lid. The experimental apparatus appeared to control for "intelligence" (e.g., scooping blocks into a pile or turning the box on its side so that many could be placed in the bucket simultaneously) and to require a uniform degree of on-task time for completion.

The "Goodie box" was located in the main office or hall and filled with colored pens, crayons, balloons, "name brand" stickers (e.g., Power Rangers, Ninja Turtles, etc.), and other items specifically tailored to the interests of young boys (e.g., toy cars and airplanes, boats, rubber balls, whistles, figurines of firemen/policemen, and sheriffs' badges).

Design

The request or screening trials (no stated consequences) were first presented in 5 consecutive trials prior to the experimental manipulation. Each screening trial was conducted on a different day. Experimental trials consisted of the experimenter stating rules differing in reinforcement availability or timing. Only one trial was presented each day and the yoked pairs (1 noncompliant and 1 compliant child) participated in only one condition each day. Conditions (immediate, delayed, and no reinforcement) were randomly presented with allowances in the schedule to insure that 5 trials of each condition were presented to each pair. Table 1 displays experimental conditions, describing reinforcer delivery and response opportunities for each pair of boys in Experiments 1 and 2.

Procedure

Experiment 1 was conducted in preschool classroom settings during "free

Table 1

Experimental conditions, reinforcer delivery, and response opportunity for experiments 1 and 2.

Condition	Reinforcer Delivery	Opportunity to Respond	
		Experiment 1	*Experiment 2*
Immediate Reinforcer	Immediate access to Goodie box	Immediate	15-20 minute delay
Delayed Reinforcer	3-hour delay in access to Goodie box	Immediate	15-20 minute delay
No Reinforcer	No access to Goodie box	Immediate	15-20 minute delay

Note: Three yoked pairs of noncompliant and compliant boys were randomly exposed to all conditions in each experiment.

play" between 8:30 and 9:30 a.m., 4 days per week for approximately 9 weeks. The experimenters approached children already at play and stated rules representative of one of the experimental conditions (see below). To control for potential social consequences from other adults and children, the rules were stated only when a child participating in the study was present. Other children were asked to leave the immediate area or the participant was taken aside during instruction-giving. Teachers were told to limit interaction with children participating in the study while in progress. After stating the rule, the experimenter did not interact with the child and ignored attempts to interact.

Observation Method. Because the investigation took place within a "natural" classroom setting, precautions were taken to ensure the validity of observations. In the "acclimation period" prior to the onset of the investigation, the experimenters went to classrooms as "observers" to reduce reactivity. The experimenters casually observed teachers and children for one to two hours during a morning free play session on the day prior to the beginning of the study. Experimenters provided no social or material reinforcement during the acclimation period. Additionally, five minute periods of acclimation were allotted prior to subsequent experimental sessions.

After delivering a "rule," the experimenter left the room and the participants were observed through a one-way mirror. The observers consisted of the primary author (who also delivered the rules to the children) and a second trained observer blind to the specific hypotheses but not to the experimental conditions.

Data Collection and Interobserver Reliability Ratings. Following the statement of requests or contingencies describing immediate, delayed, or no reinforcers, experimenters scored a completion for the task if a child placed all 82 blocks into a large plastic bucket. Using an interval recording strategy, observers recorded whether or not the child had dropped a block into the bucket during each 10 second interval of task performance. Thus, if the child persisted in the task beyond 5 minutes, a completion could also be scored if the child worked "consistently" until all 82 blocks had been picked-up. Working "consistently" was defined as placing at least one block in the box over 6 consecutive, 10-second intervals. If the child did not respond in 6 consecutive intervals (after 5 minutes had already elapsed) the trial was scored a noncompletion. These scoring rules were adopted to more accurately characterize the performances of children who complied with task demands but exhibited lower rates of responding. Reliability for

task completion was calculated for 26 of 90 trials (29%) during this phase using Kappa (Cohen, 1965) and was estimated at approximately 96%. Kappa across individual participants ranged from a low of 87% to 100%.

Experimental Conditions. Following baseline or "request" trials, each pair of boys was exposed to the following experimental conditions in randomly determined order; No Reinforcer (NR), Immediate Reinforcer (IR), or Delayed Reinforcer (DR). Because child behavior may be under the control of a rule describing a contingency or simply general demand characteristics, the impact of implied social consequences typically associated with rule-following must also be considered. Thus, the phrase, **"I don't care if you pick them up or not,"** was used to reduce the possibility that implied social consequences, rather than the delivery of reinforcers, controlled responding. The phrase was stated despite the fact that no social reinforcers were provided. Within each condition comprehension was checked by asking the subjects to repeat the instructions.

During the Request condition the experimenter stated only an incomplete rule specifying picking up blocks, but without specifying a consequence. For example, **"(Child's name), would you pick up all the blocks?"** No feedback was delivered during these baseline screening trials. During the condition specifying immediate reinforcers, the experimenter stated a complete rule describing an immediate consequence for picking up the blocks. For example, the experimenter said, **"(Child's name), here are some things to pick up. I don't care if you pick them up or not. Here's the rule: If you pick up all the blocks now, you can go to the Goodie box when you are finished."** The experimenter provided performance feedback and a consequence immediately after the child picked up (or failed to pick up) the blocks in the immediate reinforcer condition. The experimenter said, **"(Child's name), you did (or did not) follow the rule about picking up the blocks, now you can (or *cannot*) go to the Goodie box."** In the no reinforcer condition the children were told they would not have access to the Goodie box. The experimenter now stated, **"(Child's name), here are some things to pick up. I don't care if you pick them up or not. Here's the rule: Pick up all the blocks now, but you cannot go to the Goodie box when you are finished."** Feedback was provided immediately after a completion or noncompletion was scored. The experimenter said, "you picked up (or did not pick up) all the blocks, remember you can't go to the Goodie box today." During the delayed reinforcer condition, the experimenter stated complete rules describing a three-hour delay in the delivery of a consequence. For example, the experimenter said, **"(Child's name), here are some things to pick up. I don't care if you pick them up or not. Here's the rule: If you pick up all the blocks now, you may go to the Goodie box at lunch time,"** a readily identifiable time of day for young children. Feedback was provided immediately after a completion or noncompletion was scored. The experimenter said, "you picked up (or did not pick up) all the blocks, remember you can (or cannot) go to the Goodie box at lunch time."

Results and Discussion

Table 2 displays task completion data (as percent of trials completed) for noncompliant and compliant groups as determined through their responses to baseline requests. Data from Table 2 are presented graphically in Figure 1.

When individual data (see Table 2) are collapsed into groups they show that under conditions of immediate reinforcement the performances of compliant (100% compliance) and noncompliant boys (93%) are quite similar. Visual inspection (Figure 1) suggests that as the opportunity for reinforcement becomes more delayed (100% vs. 60%) or nonexistent (80% vs. 20%), noncompliant boys completed a much lower percentage of tasks. That is, while compliant boys' performances were consistent across reinforcement parameters, noncompliant boys appeared much more sensitive

Table 2

Task completion by condition for noncompliant and compliant boys: Experiment 1 (Immediate opportunity to respond).

		EXPERIMENTAL CONDITIONS				
C	P	Request	IR	DR	NR	Totals
	1	4/5 (80)	5/5 (100)	5/5 (100)	4/5 (80)	18/20 (90)
	2	5/5 (100)	5/5 (100)	5/5 (100)	5/5 (100)	20/20 (100)
	3	5/5 (100)	5/5 (100)	5/5 (100)	3/5 (60)	18/20 (90)
SUBTOTAL		14/15 (93)	15/15 (100)	15/15 (100)	12/15 (80)	56/60 (93)
NC	4	0/5 (0)	4/5 (80)	3/5 (60)	0/5 (0)	7/20 (35)
	5	0/5 (0)	5/5 (100)	3/5 (60)	3/5 (60)	11/20 (55)
	6	0/5 (0)	5/5 (100)	3/5 (60)	0/5 (0)	8/20 (40)
SUBTOTAL		0/15 (0)	14/15 (93)	9/15 (60)	3/15 (20)	26/60 (43)
TOTALS		14/30 (47)	29/30 (97)	24/30 (80)	15/30 (50)	82/120 (68)

Note: **IR**=Immediate Reinforcer; **DR**=Delayed Reinforcer; **NR**=No Reinforcer. **C**=Compliant. **NC**=Noncompliant. **P**=Participant. Numbers within the cells indicate the ratio of number of tasks completed/tasks presented. The parenthetical number on the second line is the percentage resulting from that ratio.

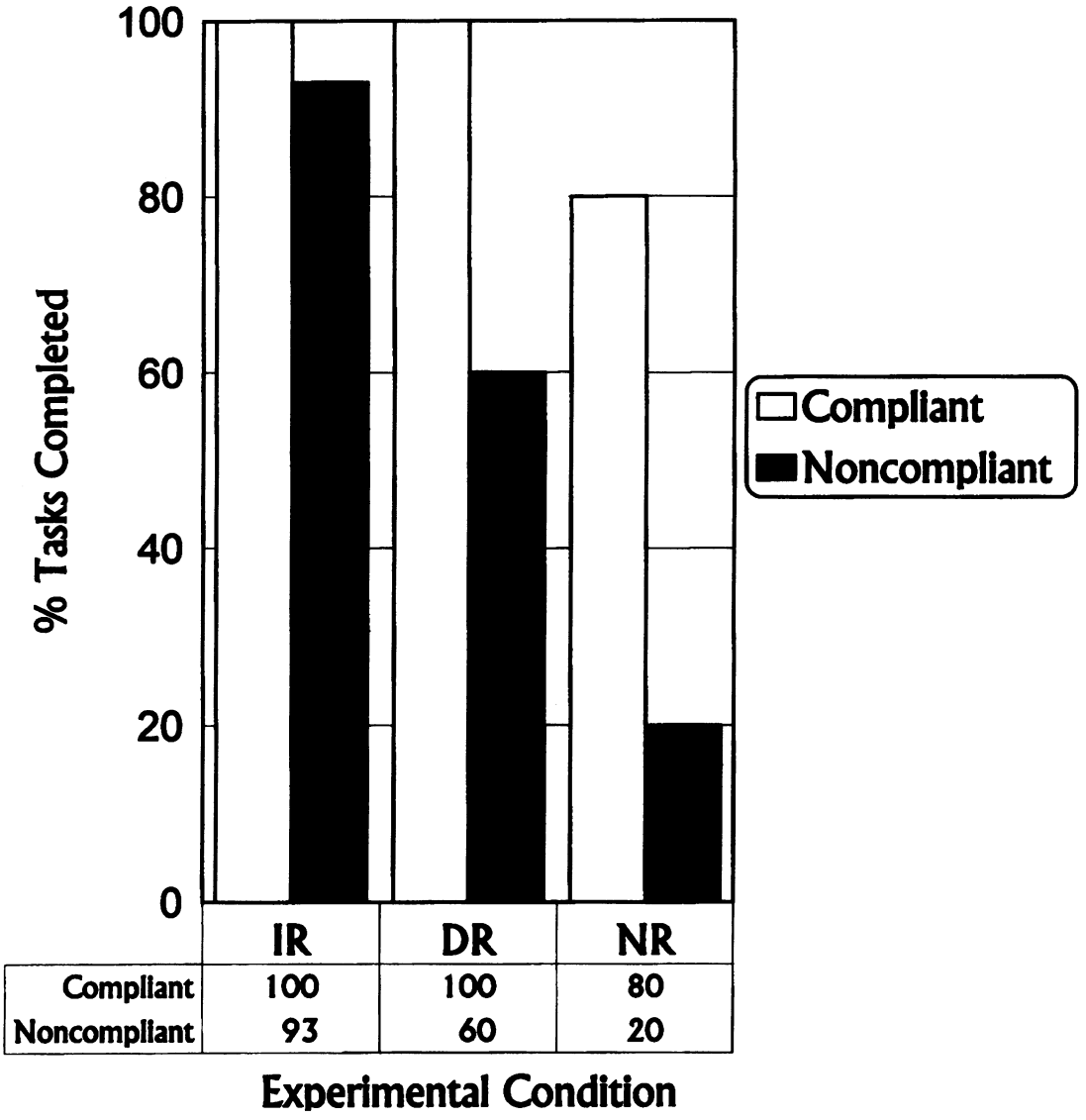

Fig. 1. Task completion by condition: Experiment 1 (Immediate Opportunity to Respond).

to the availability of reinforcement. In most cases individual data correspond closely to small group means, with the exception of participant 5 who completed 60% of the tasks in the no reinforcer condition. As noted previous studies, it appeared that the contingency statement had a nearly immediate effect on the boys. In addition, after being informed of the unavailability of the Goodie box in no reinforcement trials, both noncompliant and compliant boys frequently inquired about the prospect of future consequences (e.g., Will I get to go to the Goodie box tomorrow?). Additionally, after being informed that the no reinforcement condition was in effect, one noncompliant boy would often quickly reply, "I don't want to pick them up" and commence some other activity. Another boy consistently played with the blocks, stacking them, rather than picking them up, unless he was informed that he could go to the Goodie Box after picking up the toys.

Schlinger (1990, 1993; see also, Blakely & Schlinger, 1987) has repeatedly argued against considering all verbal stimuli rules. Instead, he has suggested that only stimuli which are function-altering warrant the

label "rule." While it was clear that the noncompliant boys responded differentially to the contingencies in Experiment 1, it remains unclear whether this was due to the evocative or possibly function-altering effects of the contingency statement. By contrast, compliant boys appeared almost totally insensitive to the delivery of consequences and complied at the nearly 100% level across all conditions. In Experiment 2, we evaluated the utility of distinguishing between "verbal stimuli" in terms of their function-altering versus evocative effects.

EXPERIMENT 2

METHOD

Design

Experiment 2 used the same participants as Experiment 1. The experimental apparatus, setting, and procedure were unchanged with the exceptions noted below. This portion of the study was completed in approximately 5 weeks. Each condition (immediate, delayed, and no reinforcement) was again presented randomly, with allowances in the random schedule made to insure (as nearly as possible) an equal number of trials was presented in each condition. The key difference between Experiments 1 and 2 was the imposition of a 15 to 20 minute delay in the opportunity for children to respond to the rule statement. For example, in the immediate reinforcer condition the experimenter now stated, **"(Child's name), I'm going to put out some blocks for you to pick up later. I don't care if you pick them up or not. If you pick up the blocks then you may go to the Goodie box as soon as you are finished."** After the rule statement, the experimenter waited for 15 to 20 minutes before re-entering the classroom. The experimenter entered the classroom with a large plastic bucket filled with wooden blocks, spilled the blocks onto the carpet, locked the lid of the bucket and left the room. An observer noted for each trial whether or not the participant looked at the bucket and blocks after they were left on the carpet. Participants appeared to make eye contact with the bucket and blocks on 100% of the trials.

RESULTS AND DISCUSSION

Data showing individual task completion are presented in Table 3. Data from Table 3 are grouped and presented graphically in Figure 2.

When individual data (see Table 3) are collapsed into groups they show that under conditions of both immediate and delayed reinforcement, compliance levels remained relatively high and did not appear to differ substantially for noncompliant and compliant boys. However, when the rule specified that the Goodie box was unavailable, both compliant and noncompliant boys rarely complied (36% vs. 0%). The 36% difference observed between the groups in the no reinforcer condition was largely attributable to one child (i.e., P2) who complied with every request presented regardless of the status of the reinforcer specified in the rule. However, for most every other participant, rules specifying the delivery of reinforcers (whether immediate or delayed) controlled compliance, even when a 15 to 20 minute interval between rule delivery and the opportunity to respond was imposed. The high levels of compliance observed compared to the delayed opportunity to respond phase of Mistr and Glenn's (1992) study suggests that the verbal stimuli used in this study may have had function-altering effects and thus may properly be called rules.

GENERAL DISCUSSION

The purpose of the present experiments was to investigate several questions regarding the control of behavior in young children by verbal stimuli. A primary objective was to examine the joint influence of prior compliance history (as assessed through teacher nomination and behavioral screening procedures) and three reinforcement parameters. The results of Experiment 1 suggest that when immediate reinforcement is available the performance of noncompliant and compliant boys is virtually indistinguishable and

Table 3

Task completion by condition for noncompliant and compliant boys: Experiment 2 (Delayed opportunity to respond).

		Experimental Conditions			
C	P	IR	DR	NR	Totals
	1	2/2 (100)	4/4 (100)	1/4 (25)	7/10 (70)
	2	4/4 (100)	3/3 (100)	3/3 (100)	10/10 (100)
	3	2/2 (100)	1/2 (50)	0/4 (0)	3/8 (38)
SUBTOTAL		8/8 (100)	8/9 (89)	4/11 (36)	20/28 (71)
NC	4	3/4 (75)	4/4 (100)	0/4 (0)	7/12 (58)
	5	3/3 (100)	3/4 (75)	0/2 (0)	6/9 (67)
	6	2/4 (50)	2/4 (50)	0/4 (0)	4/12 (33)
SUBTOTAL		8/11 (73)	9/12 (75)	0/10 (0)	17/31 (55)
TOTALS		16/19 (84)	17/21 (81)	4/21 (19)	37/59 (63)

Note: **IR**=Immediate Reinforcer; **DR**=Delayed Reinforcer; **NR**=No Reinforcer. **C**=Compliant. **NC**=Noncompliant. **P**=Participant. Numbers within the cells indicate the ratio of number of tasks completed/tasks presented. The parenthetical number on the second line is the percentage resulting from that ratio.

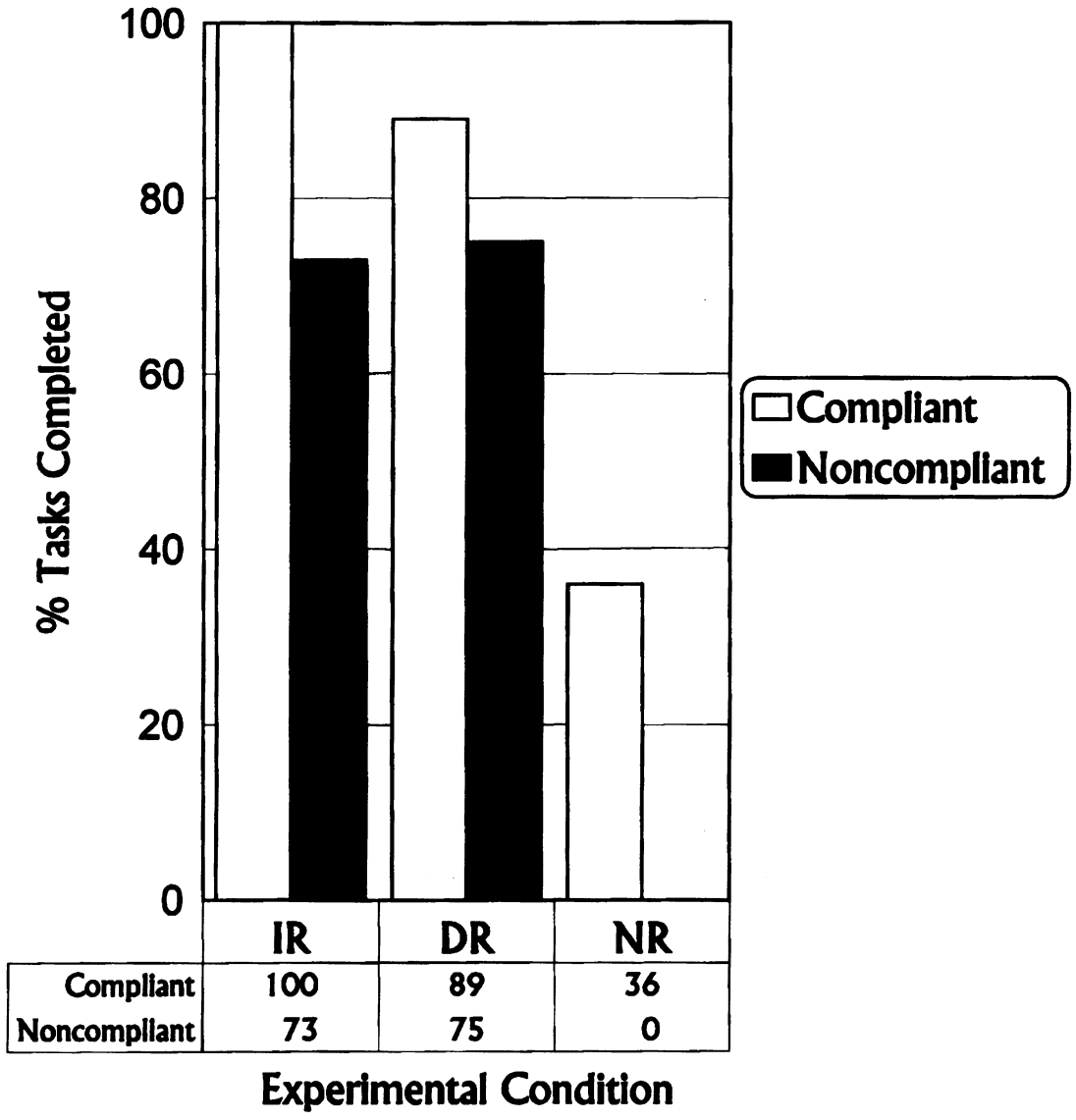

Fig. 2. Task completion by condition: Experiment 2 (Delayed Opportunity to Respond).

compliance is uniformly high. These data are consistent with those presented by Braam and Malott (1990) and Mistr and Glenn (1992), indicating that statements clearly specifying responses and immediate consequences, such as selecting a toy from the Goodie box, reliably control behavior. These data also correspond to the clinical literature dealing with child noncompliance; that is, it has been noted that many hyperactive, disruptive children comply more readily when rich schedules of reinforcement are delivered in close temporal relation to target behaviors (see Barkley, 1990).

When delayed outcomes were specified, consistent differences between noncompliant and compliant boys emerged in Experiment 1, but not in Experiment 2, where the opportunity to respond was also delayed. However, in neither case were the observed differences very large. Though compliant boys, in general, demonstrated consistently higher rates of compliance, noncompliant boys also maintained relatively high levels of task completion (65% in Experiment 1 and 75% in Experiment 2)

despite a 3-hour delay in access to the Goodie box. Another factor in the generally high levels of compliance observed in the delayed reinforcement conditions may have been the retention of the immediate deadline in the contingency statement (i.e., "now"). In future studies it might be worthwhile to more carefully evaluate the role of deadlines in facilitating compliance when consequences are delayed. Finally, it would be instructive to conduct future studies with more seriously noncompliant children to determine whether more stringently defined noncompliant boys would respond as "noncompliant" boys have in the present study.

Under conditions where reinforcers were unavailable, compliant boys consistently completed more tasks than noncompliant boys in Experiment 1. In Experiment 1, compliant boys outperformed their noncompliant peers by a substantial margin (i.e., 60%). Though differences approached 40% in Experiment 2, task completion was down sharply for both groups of boys; two out of three compliant and all noncompliant boys completed no tasks. Comparison of the no reinforcer and reinforcer available (e.g., immediate or delayed) conditions may thus prove instructive for examining the effect of distinguishing between the evocative and function-altering effects of the rule statement. For both immediate and delayed reinforcers, the effect of imposing a delay between the rule statement and the opportunity to respond was negligible; both noncompliant and compliant boys maintained relatively high rates of task completion. It is also possible that if the delay to reinforcement period was lengthened, the participants would have come to respond more differentially.

Two additional points might provide a clearer picture of these relations in future investigations. First, the drop in compliance observed in the no reinforcer component of Experiment 2 [and also in Mistr and Glenn (1992)] could be due to sequence effects. That is, a large number of trials with an immediate opportunity to respond preceded the delayed response opportunity trials. Future studies should counterbalance or otherwise control for such interference effects. Also, isolating the effect of function-altering stimuli may be easiest to discern on the first or earliest trials of novel tasks. After several trials with a myriad of consequences delivered contingent on responding, it may be more difficult to demonstrate "pure" function-altering effects because the trials themselves may come to exert direct stimulus control. As Andronis (1991) suggests, perhaps "rule-governance over the listener's behavior....occurs only on the first instance of an organism's exposure to a novel contingency" (p.231). If this is so, new methodologies may be necessary to isolate function-altering effects.

In contrast to Mistr and Glenn (1992), the present data would suggest that 4 and 5-year-old boys **are** capable of consistent responding to verbal stimuli which have function-altering effects. In this case, we may properly call these verbal stimuli "rules" because the statement – If you pick up the blocks, you may go to the Goodie Box as soon as you are finished – seemed to endow the sight of the blocks with discriminative or "evocative" function which varied systematically with the stated reinforcement contingency. That is, the sight of the blocks became discriminative for either picking up the blocks or performing some other behavior, such as playing with them, depending upon the contingency specified in the rule (see Schlinger, 1993, p. 16, for a detailed analysis). Direct observation also suggested that upon sighting the blocks in the reinforcement conditions of Experiment 2, the children rapidly approached and began to pick them up almost immediately. Finally, the performance of participant S2 (i.e., 10 completions in 10 attempts combining all conditions) in Experiment 2 suggests that the shaping of a generalized class of behavior, loosely termed "rule-following," is possible among very young boys.

As in many other studies of child behavior involving the repeated presentation of tasks, significant limitations were placed on the number of participants which may

limit the generality of the results. Additionally, though an effort was made to recruit participants who displayed noncompliance in the classroom, the criteria for selection were not stringent. Recruitment of more seriously noncompliant (i.e., clinical samples) children would be necessary before any conclusions can be made about the aspects of verbal stimuli which appear relevant to the initiation, development, and maintenance of behavior problems among "behaviorally disordered" youth. Nevertheless, the present results, tentative though they are, do appear relevant to the more general child behavior analysis literature.

Future behavior analytic research documenting the frequency and type of compliance training (in terms of verbal behavior) in naturalistic settings (e.g., home, school) will be valuable for exploring the function of performance deadlines, reinforcement parameters and other aspects of verbal behavior. Also, the efficacy of deadlines in influencing compliance among adults attests to the need for further studies with children (see Braam & Malott, 1990). Perhaps the most plausible reason for the failure of deadlines to consistently enhance compliance in existing studies with young children is that parent or teacher directives may rarely involve the option of delayed task completion. Indeed, Gralinski and Kopp (1993) have found that the earliest parental directives usually involve child safety. That the child must "do it now," may be an implicit feature of parental rule stating with children of this age. Still, research documenting the extent to which parents or other adults may explicitly "train" compliance, particularly with respect to the evocative and function-altering effects of verbal stimuli, is much needed.

In conclusion, the results show that children who were identified by their teachers as generally less compliant than their peers are capable of similar levels of compliance in the presence of contingencies specifying immediately available access to reinforcers. The significance of this finding should not be overlooked. Teachers may be apt to make global statements about the behavior of noncompliant or disruptive children in classroom settings. That a compliance with a simple, but commonly occurring task in early preschool and grade school classrooms (e.g., picking up toys) seems to be sensitive to prevailing reinforcement contingencies suggests that compliance problems among preschoolers need to be carefully examined and analyzed before the child is labeled a conduct or behavior problem. Early interventions based on reinforcing rule-following as an operant class or establishing a correspondence between nonverbal and verbal behavior may be especially promising in light of these data.

REFERENCES

Andronis, P. (1991). Rule-governance: Enough to make a term mean. In L. J. Hayes & P. Chase (Eds.), *Dialogues on verbal behavior*. Reno, Nevada: Context Press.

Barkley, R.A. (1990). *Attention Deficit Hyperactivity Disorder: A handbook for diagnosis and treatment*. New York: The Guilford Press.

Bijou, S. W. (1993). *Behavior analysis of child development*. Reno, Nevada: Context Press.

Blakely, E., & Schlinger, H. (1987). Rules: Function-altering contingency-specifying stimuli. *The Behavior Analyst, 10*, 183-187.

Braam, C., & Malott, R.W. (1990). "I'll do it when the snow melts": The effects of deadlines and delayed outcomes on rule-governed behavior in preschool children. *The Analysis of Verbal Behavior, 8*, 67-76.

Cohen, J. (1965). Some statistical issues in psychological research. In B.B. Wolman (Ed.), *Handbook of clinical psychology*. New York: McGraw-Hill.

Gralinski, J. H., & Kopp, C. B. (1993). Every day rules for behavior: Mothers' requests to young children. *Developmental Psychology, 29*, 573-584.

Malott, R. W. (1989). The achievement of evasive goals: Control by rules describing contingencies that are not direct acting. In S. C. Hayes (Ed.), *Rule-governed behavior: Cognition, contingencies, and instructional control*. New York: Plenum.

Mistr, K. N., & Glenn, S. S. (1992). Evocative and function-altering effects of contingency-specifying stimuli. *The Analysis of Verbal Behavior, 10*, 11-21.

Rachlin, H. (1991). Introduction to modern behaviorism (3rd edition). New York: W. H. Freeman.

Schlinger, H. D. (1990). A reply to behavior analysts writing about rules and rule-governed behavior. *The Analysis of Verbal Behavior, 8*, 77-82.

Schlinger, H. D. (1993). Separating discriminative and function-altering effects of verbal stimuli. *The Behavior Analyst, 16*, 9-24.

Schlinger, H. D. (1995). *A behavior analytic view of child development*. New York: Plenum.

Schweitzer, J. B., & Sulzer-Azaroff, B. (1988). Self-Control: Teaching tolerance for delay in impulsive children. *Journal of the Experimental Analysis of Behavior, 50*, 173-186.